ΠΑΝΕΠΙΣΤΗΜΙΟ ΔΥΤΙΚΗΣ ΑΤΤΙΚΗΣ
UNIVERSITY OF WEST ATTICA

35ο Πανελλήνιο και 1ο Διεθνές Συνέδριο Στατιστικής

Στατιστική στις Επιστήμες Υγείας

25-28 Μαΐου 2023

Πανεπιστήμιο Δυτικής Αττικής
Πανεπιστημιούπολη Αρχαίου Ελαιώνα

Πληροφορίες
https://gsi-conference.uniwa.gr

ΔΙΟΡΓΑΝΩΣΗ

ΕΛΛΗΝΙΚΟ ΣΤΑΤΙΣΤΙΚΟ ΙΝΣΤΙΤΟΥΤΟ

ΠΑΝΕΠΙΣΤΗΜΙΟ ΔΥΤΙΚΗΣ ΑΤΤΙΚΗΣ
UNIVERSITY OF WEST ATTICA

Τόμος Περιλήψεων του 35ου Πανελληνίου Συνεδρίου και πρώτου Διεθνούς Συνεδρίου Στατιστικής / Book of Abstracts of 35th Panhellenic Statistics Conference and First International Conference of Statistics "Ελληνικό Στατιστικό Ινστιτούτο/ Greek Statistical Institute

Συντάκτες/Editors: Elefterios Angelis, Miltiadis Chalikias, Alexandros Karagrigoriou, Georgios Papageorgiou Τόπος έκδοσης/ Place of publication: Αθήνα, Ελλάδα/Athens, Greece

Έτος έκδοσης/ Year of publication: 2023

imposed global budget caps might constitute a barrier to the universal access of people to medicines and healthcare provision services in general. The main justification for these concerns is the insufficient methods used so far in establishing budgets. In this work, we present an analytical process based on financial and statistical data in order to shape a future healthcare policy, targeting not to the restrictions of needs, but the Optimization and Rationalization of the given budgets to the actual needs of a population.

A machine learning framework for cardiovascular health prediction modeling the interplay between various environmental, neighborhood and socio-economic features: a German-wide application

Nikolaos Nikolaou[1,4], Mahyar Valizadeh[1], Sahar Behzadi[1], Jeroen Staab[2,3], Marco Dallavalle[1,4], Annette Peters[1,4], Alexandra Schneider[1], Hannes Taubenböck[2,5], and Kathrin Wolf[1]

[1] Institute of Epidemiology, Helmholtz Zentrum München, German Research Center for Environmental Health, Neuherberg, Germany;

[2] German Aerospace Center (DLR), German Remote Sensing Data

Center, Geo-Risks and Civil Security, Oberpfaffenhofen, Germany;

[3] Geography Department, Humboldt-University Berlin, Berlin, Germany;

[4] Institute for Medical Information Processing, Biometry, and Epidemiology, Pettenkofer School of Public Health, LMU Munich, Munich, Germany;

[5] Institute for Geography and Geology, Julius-Maximilians-Universität Würzburg, Würzburg, Germany

email: nikolaos.nikolaou@helmholtz-munich.de

Abstract: Environmental exposures and socio-economic neighborhood characteristics have a major impact on human health and well-being. However, little is known about their interplay. Machine Learning (ML) methodologies go beyond the conventional statistical approaches and help us towards identifying the driving contextual factors and assessing their predictive ability for various health

outcomes even under high complexity. In this study, we first compared multiple ML techniques, from neighbor-based to deep learning approaches for the prediction of cardiovascular disease (CVD) mortality in 5×5 km grid cells across Germany during 2017. The models performed well in the training phase [$R^2 \geq 0.85$, mean squared error (MSE) ≤ 0.005], and moderate to well in the testing set ($0.27 \leq R^2 \leq 0.66$, $0.011 \leq MSE \leq 0.024$). All models were highly correlated ($0.69 \leq$ Spearman $r \leq 0.82$) and identified similar predictors as the main drivers for CVD mortality (e.g., the deprivation index, proportion of foreigners and air pollution), though prediction maps indicated spatial heterogeneity across the country. Currently, we aim to extend this analysis on the prediction of hypertension, an important risk factor for CVD morbidity and mortality, by using advanced and highly resolved environmental maps and recent health data from the largest German cohort, the NAKO study. The work is still in progress and the results will be presented at the conference.

The Method of Moments vs Maximum Likelihood An overestimated difference?

I. Oikonomidis, S. Trevezas

National and Kapodistrian University of Athens

email: goikon@math.uoa.gr

Abstract: The oldest and still most popular frequentist estimation methods for fitting models to data, assumed to be a random sample from a parametric distribution, are undoubtedly Pearson's Method of Moments (ME) and Fisher's Maximum Likelihood (MLE). Even though the MLE presents several desired properties and is generally considered superior to ME, a typical issue presented in various common distributions, such as Beta and Gamma, is that the score equations cannot be solved explicitly, forcing the employment of numerical methods. This presentation explores alternative moment-type estimators with asymptotic properties (strong consistency, asymptotic normality) comparable to those of the MLE for a large class of well-known distributions. These estimators can either be utilized directly for inference or be used as initialization in the numerical methods employed to approximate the MLE safely (avoiding convergence to irrelevant stationary points) and rapidly (enjoying the nice local convergence properties of

ΧΟΡΗΓΟΙ / SPONSORS